LONG RUN AND SHORT RUN COINTEGRATION RELATIONSHIP FOR TOURIST ARRIVALS IN MALAYSIA

by

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ABSTRAK

Pelancongan ialah satu sumber pendapatan penting tukaran asing bagi kebanyakan negara di dunia. Kajian ini bertujuan menyelidik hubungan dinamik antara bilangan ketibaan pelancong di Malaysia (TA) and pembolehubah yang terpilih bagi sembilan negara terpilih; China, Eropah, Indonesia, Jepun, Arab Saudi, Singapura, Thailand, United Kingdom (UK) and Amerika Syarikat.Tambahan pula, kajian ini menyelidik hubugan antara bilangan ketibaan pelancong di Malaysia (TA) dan pembolehubah terpilih dengan kewujudan dan pembolehubah patung eksogenus.

Dalam kajian ini, pembolehubah terpilih ialah Indeks Harga Pengguna negara asal (CPI), kadar tukaran (EXR) Ringgit Malaysia kepada satu unit mata wang asing negara asal, bilangan ketibaan pelancong dari negara asal ke destinasi pengganti Singapura (SUBS) dan Thailand (SUBT). Data bulanan dari Januari 1999 hingga September 2006 digunakan dalam analisis. Pembolehubah eksogenus adalah pengeboman di Indonesia, letusan wabak SARS, serangan Pusat Perdagangan Dunia di Bandaraya New York and suhu bagi negara asal. Penyelidikan dijalankan dengan menggunakan prosedur piawai bagi menentukan hubungan jangka panjang dan jangka pendek seperti ujian punca unit, ujian kointegrasi Johansen Juselius, model Vektor Autoregrasi (VAR), ujian penyebab Ganger dan model Vector Pembetulan Ralat (VEC).

Analisis menunjukkan kewujudan punca unit dalam siri mencadangkan pembolehubah adalah tidak pegun dan mempunyai tren. Walau bagaimanapun, semua

pembolehubah adalah pegun pada pembezaan pertama. Keputusan awal dari analisis regresi menunjukkan variasi dalam bilangan ketibaan pelancong boleh dijelaskan oleh empat pembolehubah yang terpilih. Keputusan ujian kointegrasi menunjukkan terdapat hubungan jangka panjang antara ketibaan pelancong dengan pembolehubah terpilih.

Nilai koefisien yang kecil bagi sebutan pembetulan ralat untuk kesemua sembilan negara terpilih mencadangkan pengambilan masa yang sederhana panjang jika berlaku sebarang penyimpangan untuk kembali ke keseimbangan. Hubungan jangka panjang yang menunjukkan kaitan positif antara TA dan SUBT mencadangkan pelancong asing selalunya melawat Malaysia dan Thailand sebagai satu destinasi pelancongan. Analisis menunjukkan kadar tukaran wang memberi kesan negatif terhadap bilangan ketibaan pelancong di Malaysia dari Singapura dan UK mencadangkan mata wang tempatan yang kuat bukan satu faktor utama yang mempengaruhi kepada orang British dan Singapura bercuti di Malaysia.

Analisis dengan empat pembolehubah patung menunjukkan dalam kebanyakan kes, ketibaan pelancong secara negatif dipengaruhi oleh kejadian bencana seperti letusan wabak SARS and pengeboman oleh pengganas. Analisis juga mendapat bukti (walaupun tidak signifikan) untuk kesan suhu negara asal terhadap bilangan ketibaan pelancong.

ABSTRACT

Tourism is an important source of foreign exchange earnings for many countries in the world. This study aims to investigate the dynamic relationship between number of tourist arrivals in Malaysia (TA) and the selected variables for nine selected countries; China, Europe, Indonesia, Japan, Saudi Arabia, Singapore, Thailand, the United Kingdom (UK) and the United States (US). Furthermore, this study investigates the linkages between TA and the selected variables with and without the existence of the exogenous dummy variables.

In this study, the selected variables are Consumer Price Index of origin country (CPI), exchange rate (EXR) of Malaysia Ringgit to a unit of origin country currency, number of tourist arrivals from origin country to substitute destination Singapore (SUBS) and Thailand (SUBT). Monthly data from January 1999 to September 2006 is used in the analysis. The exogenous dummy variables are bombing in Indonesia, severe acute respiratory syndrome outbreak, attack on World Trade Center in New York City and temperature of origin country. Investigation is carried out using standard procedures for determining long run and short run relationship such as unit root test, Johansen and Juselius cointegration test, Vector Autoregression (VAR) model, Granger causality test and Vector Error Correction (VEC) model.

The analysis shows the existence of unit root in the series suggesting the variables are non-stationary and contain trend. However, all the variables are stationary at first differenced. Preliminary results from regression analysis reveal that a large

variation in the number of tourist arrivals can be explained by the chosen four variables. The results of cointegration test show that there is a long run relationship between TA and the selected variables.

The small value of coefficient for the error correction term for all the nine selected countries suggest that it would take a moderate time for any short term deviation to return to its equilibrium. Long run relationship shows that positive relationship between TA and SUBT suggests that foreign tourists usually visit Malaysia and Thailand as a single holiday destination. The analysis shows that exchange rate negatively affects tourist arrivals in Malaysia from Singapore and the UK which suggest that strong local currency is not a main factor affecting British and Singaporean tourists for holidaying in Malaysia.

The analysis with the four dummy variables shows that in most cases, tourist arrivals are negatively affected by disastrous events such as severe acute respiratory syndrome outbreak and terrorist bombings. The analysis also found evidence (even though not significant) for the effect of temperature of origin country on tourist arrivals.

CHAPTER 1

INTRODUCTION

1.1 Introduction to tourism

According to Tourism (2007), tourism is travel for predominantly recreational or leisure purposes, and also refers to the provision of services in support of this act. The World Tourism Organization (WTO) defined tourists as people who travel to and stay in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited. As a service industry, tourism has numerous tangible and intangible elements. The major tangible elements include transportation, accommodation, and other components of a hospitality industry. Meanwhile, the intangible elements relate to the purpose or motivation for becoming a tourist, such as rest, relaxation, the opportunity to meet new people and experience other cultures, or simply to do something different and have an adventure.

The defining feature of the tourism industry is not the product but the consumer – the 'tourist'. Tourism is not grouped into a single heading within the Standard Industrial classification for instance, which is normally used to define industry categories. The business generated by tourists is crucial to many hotels, restaurants, travel services and entertainment facilities, but it does not account for all the business of these sectors. For this reason it is difficult to measure the exact number of jobs or amount of income that are either directly or indirectly dependent on tourism. Generally,

for sectors that depend on tourism for some of their business are hotels, other tourist accommodation, restaurants, cafes, public houses travel agencies, tour operators, libraries, museums, cultural activities, sports and other recreation activities. On the other hand, clearly such businesses are by no means entirely dependent on tourism, and will be used by tourists and non-tourists alike.

Tourism is a sector that involves a multiplicity of economic activities responding to differentiated demands with specific characteristics at the national and international levels. The complexity and interaction of the tourism activities justify its consideration as a special sector that integrates a set of economic activities related mainly to traveling and accommodation services. The combination of demand and supply characteristics at the national and international levels creates some difficulties in modelling the tourism activity as a whole. However, the increasing importance of the tourism sector in terms of its contribution to the national product, the employment and the balance of payments creates the need to investigate the determinants of tourism flows within a specific country, and especially for countries with great dependence on this sector.

Tourism is an important source of income for many countries, especially for those with less developed modern service or industrial based economies. The economic benefits accruing to both the producers of tourist products and the tourist originating economy at the local, regional and national level have been the subject of extensive studies by both tourism experts and multidisciplinary scholars. Tourist destinations have an a priori concentration of tourism related 'raw materials'. In this case raw materials refer mainly to a combination of natural and man-made elements that are related closely with tourism demand and, unlike other aspects of economic activity, are unique to the

tourism destination and therefore cannot be transferred to or recreated at another location.

Tourism is vital for many countries, due to the income generated by the consumption of goods and services by tourists, the taxes levied on businesses in the tourism industry, and the opportunity for employment and economic advancement by working in the industry. For these reasons, NGOs and government agencies may sometimes promote a specific region as a tourist destination, and support the development of a tourism industry in that area. The contemporary phenomenon of mass tourism may sometimes result in overdevelopment; alternative forms of tourism such as ecotourism seek to avoid such outcomes by pursuing tourism in a sustainable way. The terms tourism and travel are sometimes used interchangeably. In this context travel has a similar definition to tourism, but implies a more purposeful journey. The terms tourism and tourist are sometimes used pejoratively to imply a shallow interest in the cultures or locations visited by tourists.

Generally, there are three categories of tourism. Domestic tourism is tourism that involving residents of the given country traveling only within this country. Meanwhile, inbound tourism involving non-residents traveling in the given country and outbound tourism is the tourism that involving residents traveling in another country. The tourism industry generates substantial economic benefits to both host countries and tourists' home countries. Especially in developing countries, one of the primary motivations for a region to promote itself as a tourism destination is the expected economic improvement. As with other impacts, this massive economic development brings along both positive and negative consequences. Based on information given in

Economic Impacts of Tourism (2001), 698 million people traveled to a foreign country in 2000, spending more US$ 478 billion. International tourism receipts combined with passenger transport currently total more than US$ 575 billion - making tourism the world's number one export earner, ahead of automotive products, chemicals, petroleum and food. An important indicator of the role of international tourism is its generation of foreign exchange earnings. Tourism is one of the top five export categories for as many as 83% of countries and is a main source of foreign exchange earnings for at least 38% of countries. There are many hidden costs to tourism, which can have unfavorable economic effects on the host community. Often rich countries are better able to profit from tourism than poor ones. Whereas the least developed countries have the most urgent need for income, employment and general rise of the standard of living by means of tourism, they are least able to realize these benefits. Among the reasons for this are large scale transfer of tourism revenues out of the host country and exclusion of local businesses and products.

Based on information given in Malaysia Launches Visit Malaysia Year (2007), the Ministry of Tourism Malaysia planned 50 major events throughout the country, covering cultural, sports, natural as well as fashion fields, enabling visitors to witness colors of Malaysia, which is a unique multi-racial, multi-cultural and multi-religious country. To name just a few, major events include the Floral Fest in Kuala Lumpur, Dragon Boat Racing in Penang, Rainforest Musical Festival in Sarawak and Eco-challenge in Pahang National Parks. The Visit Malaysia Year 2007 demonstrates the government's determination to tap the great potential of the tourism industry, which stands as the third economic pillar and the second largest source of foreign revenue in this country. Figure 1.1 shows the export of tourism, semiconductor and petroleum

Malaysia from 2000 to 2004. The histogram was constructed based on information and data gather from website of Treasury Malaysia (http://www.treasury.gov.my).

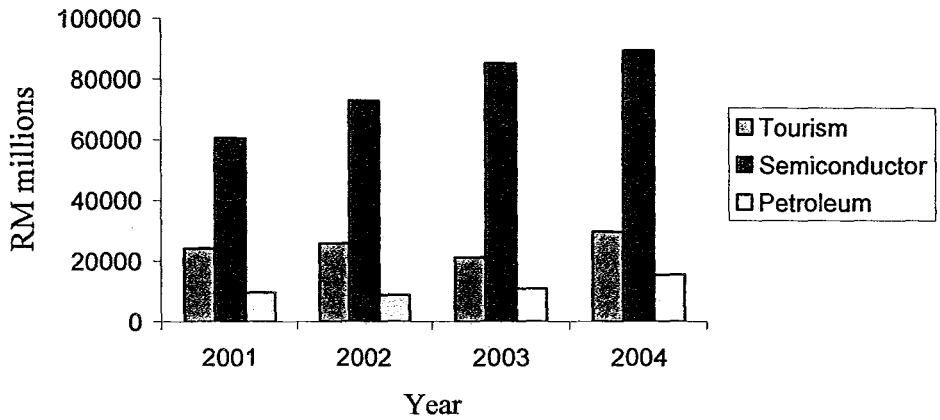

Figure 1.1: Export of tourism, semiconductor and petroleum Malaysia

According to Malaysia Launches Visit Malaysia Year (2007), under the ninth Malaysia plan (2006-2010), the Malaysia government will strive to realize the full potential of the tourism industry in order to enhance its contribution to the service sector in particular, and the economy in general. Malaysia allocated 1.8 billion ringgit to the tourism industry for the 2006-2010 period, a great surge compared with the allocation of 700 million ringgit in the previous national plan. Malaysia have sets a target of 24.6 million foreign tourist arrivals for 2010, with the tourist receipts expected to reach 59.4 billion ringgit. Currently, ASEAN countries remain the largest source of tourist arrivals to Malaysia, followed by China, India and west Asia, according to statistics from the Ministry of Tourism. Malaysia regards China as a very important market and will continue to upgrade its tourism service to attract more Chinese tourists to Malaysian. Figure 1.2 shows the total tourist arrivals in Malaysia from 1999 to 2006. The histogram was constructed based on information gather from website of Malaysia Tourism Promotion Board (MTPB) (http://www.tourism.gov.my).

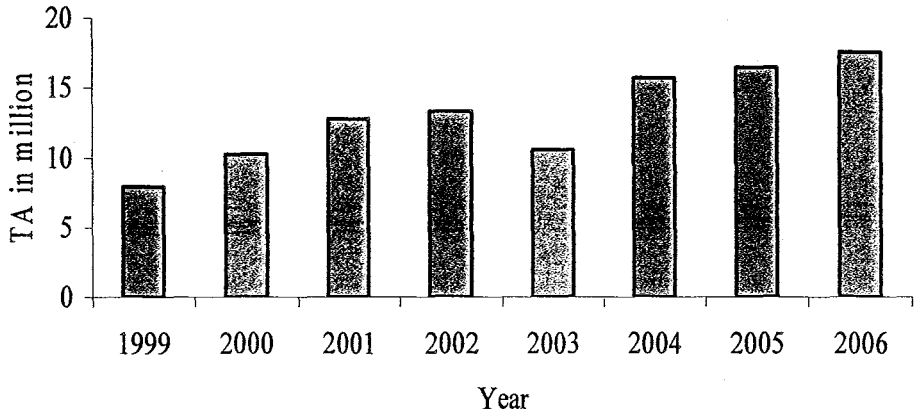

Figure 1.2: Total tourist arrivals in Malaysia from 1999 – 2006

1.1.1 Contribution of tourism industry

Government revenues from the tourism sector can be categorized as direct and indirect contributions. Direct contributions are generated by taxes on incomes from tourism employment and tourism businesses, and by direct levies on tourists such as departure taxes. Indirect contributions are those originated from taxes and duties levied on goods and services supplied to tourists. According to Economic Impacts of Tourism (2001), tourism supports some 7% of the world's workers. The rapid expansion of international tourism has led to significant employment creation. Tourism can generate jobs directly through hotels, restaurants, nightclubs, taxis, and souvenir sales, and indirectly through the supply of goods and services needed by tourism-related businesses.

Another contribution of tourism is that tourism can induce the local government to make infrastructure improvements such as better water and sewage systems, roads, electricity, telephone and public transport networks, all of which can improve the

quality of life for residents as well as facilitate tourism. Tourism can be a significant, even essential, part of the local economy. As the environment is a basic component of the tourism industry's assets, tourism revenues are often used to measure the economic value of protected areas. There are other local revenues that are not easily quantified, as not all tourist expenditures are formally registered in the macro-economic statistics. Money is earned from tourism through informal employment such as street vendors, informal guides, taxi drivers and so on. The positive side of informal or unreported employment is that the money is returned to the local economy, and has a great multiplier effect as it is spent over and over again.

Based on information given in Asia Pacific Tourism Industry: Current Trends and Future Outlook (2005), tourism is one of the most important sectors in the economies of Asia Pacific countries. Currently, tourism is the most important sector and major source of foreign exchange earnings in Thailand, Australia, and New Zealand. It is ranked second in Hong Kong, Malaysia and the Philippines, and ranked third in Singapore and Indonesia. For example, in New Zealand, the tourism industry employs more than 200 thousand people, with projections of a 14% annual growth till the year 2000. In Hong Kong, tourism employs 12% of the workforce and contributes about 7% to the economy. The tourism sector in Thailand supports over 1.5 million jobs and contributes 5% to the economy. Tourism is also gaining importance in China. In Singapore, the healthy overall balance of payments is attributed to the huge surplus achieved by the tourism sector which contributes about 10% to the economy. Despite Singapore's open economy, and its vulnerability to external shocks and import leakages, tourism has made a significant contribution to output, employment, and income.

Tourism has become one of the world's most important sources of employment. It stimulates enormous investment in infrastructure, most of which also helps to improve the living conditions of local people. It provides governments with substantial tax revenues. Most new tourism jobs and business are created in developing countries, helping to equalize economic opportunities and keep rural residents from moving to overcrowded cities.

1.1.2 Factor affecting tourism

There is a huge number of potential factors affecting tourism demand and the specification of the demand function varies according to the countries or regions used. Socioeconomic factors, such as, income level, relative prices between the origin and the destination places, demography, urbanization and length of the leisure time; technical factors related to easier communications and transport facilities; psychological and cultural factors reflecting personal preferences and the style of life of the potential travellers; and random factors related to unexpected events, like political instability, weather conditions, natural disasters, epidemic diseases, and so forth.

Income (per head) is one of the most important factors to influence the decision of people to travel. Overseas travel is expensive and is generally regarded as a luxury good. Many empirical literatures show that the demand for tourism and the length of staying are directly related to the level of income (level of personal wealth) of the potential travellers and inversely related to the domestic cost of living. Therefore, the purchasing power position of the potential travellers is the dominant factor in explaining tourist flows and the causality is expected to be strong. As their income increases,

people are more inclined to travel. It is expected that tourism demand will not only be influenced by current, but also by lagged income in the origin country, since changes in income may take some time to affect tourism demand.

Exchange rates are often introduced into tourism demand models in addition to, and separately from, the relative price variable. Such studies specifically examine the influence of nominal exchange rates on international tourism demand. Some researchers argue that tourists respond to exchange rate movements but not to changes in relative inflation rates when they make their decision to travel, because of limited knowledge. Tourists are well-informed of changes in exchange rates, whereas information on price changes in destinations is generally not known in advance.

Tourism is consumption of goods and has its own price differentiated along different competing places of destination. However, tourist demand does not only depend on its own price but also on the price of other alternative goods and services as well as the general price level of the domestic market. From the point of view of the origin country, the increase in domestic price level reduces the purchasing power of the potential travellers and, therefore, their demand for tourism; on the other hand, an increase in the price level of the destination country discourages tourists to move to this place or reallocate their demand to other cheaper competing places.

Tourists are also sensitive to prices, either in the form of transportation costs (airfares), or cost of living (accommodation, meals and so on) at the destination country. Relative or tourism prices, which are the frequently used explanatory variables in many studies, are costs of goods and services that tourists are likely to pay while at the

destination such as accommodation, local transportation, food, and entertainment. In measuring relative price movements in the country of origin and destination, it is desirable to have indices constructed using a basket of goods purchased by tourists. Transportation cost refers to the cost of round-trip travel between the origin and destination countries. Unlike other goods, the tourist has to be transported to the destination rather than the reverse. Hence, the demand for transportation in international travel is a derived demand, namely to purchase tourism services. Transportation costs are usually measured by the price of air travel. However, the problem of measuring the effective transportation cost arises, namely, the actual costs borne by tourists. This problem is caused mainly by the pricing practices of airlines, which have resulted in two main categories of passenger fares on scheduled airline services, namely, "normal" fares and "special" fares. Normal fares are available for first, business and economy class, whereas special fares are only available for economy class, which includes excursion and promotional fares. The most widely offered type of special fares is the excursion fare.

In some studies, total population of the tourist's origin country is used as an explanatory variable in the demand for tourism function to count for the market size. The rationale behind this variable is that large countries constitute a potential market for supplying tourists and, therefore, more economies to scale can be explored

1.2 Literature review

A few previous studies are used as guidelines for this study. These studies provide initial understanding on the methodologies procedures and possible linkages

among the variables in these studies.

Dritsakis (2004) carried out an investigation to determine the changes in the long run demand for tourism to Greece from Germany and Great Britain. Annual data from the three countries covering the period from 1960 to 2000 are employed. The data consist of tourist arrivals from every country of origin (*AR*), the real income per capita (*Y*), tourism prices (*TP*), transportation cost (*TR*), exchange rates (*ER*) between the origin and destination countries. In the analysis of tourism demand to Greece from Germany and Great Britain is based on the following representation:

$$AR = f(Y, TP, TR, ER)$$

All variables are expressed in logarithms to capture multiplicative time series effects.

The methodology used for this paper is based on a Vector Error Correction (VEC) model which is used to explain German and British demand for tourism to Greece. Augmented Dickey–Fuller test for unit root is employed in the univariate framework and Johansen's maximum likelihood procedure is used to test the cointegration and to estimate the number of cointegrating vectors of Vector Autoregressive (VAR) model. Suppose the process X_t as defined by an unrestricted VAR(k) system of order $(m \times 1)$ can be written as below:

$$X_t = \prod_1 X_{t-1} + \prod_2 X_{t-2} + \ldots + \prod_k X_{k-t} + u_t$$

where X_t is $(m \times 1)$ vector of $I(1)$ variables, $\prod_i$ is $(m \times m)$ matrix of unknown parameters to be estimated ($i = 1, 2, 3, \ldots, k$). u_t is independent and identically

distributed ($m \times 1$) vector of error terms, $t = 1, 2, 3, ..., N$. Using $\Delta = (I - L)$, where L is the lag operator, the system above can be reparameterized into VEC model given as:

$$\Delta X_t = \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-1} + \prod X_{t-k} + u_t$$

where ΔX_t is an $I(0)$ vector. $\Gamma_i = \sum_{i=1}^{k-1} \prod_i - I$, $i = 1, 2, ..., k-1$ and $\prod = \sum_{j=1}^{k} \prod_j - I$. I is an $(m \times m)$ identity matrix.

An important finding from the study is that the error correction terms are negative and statistically significant. All regressors in the VEC models are statistically significant, there is no evidence of any problems associated with serial correlation, functional form, normality or heteroscedasticity. Given a statistically significant error correction model in a dynamic VEC model, it can be interpreted as evidence supporting cointegration, which suggests the existence of an equilibrium long-run relationship among important economic variables determining international tourism demand for Greece. In particular, tourist arrivals are negatively related to transportation cost and real exchange rate.

Song and Witt (2006) forecasted tourist flows to Macau from eight major countries of origin over the period from 2003 to 2008. The study used tourism demand function that takes the form:

$$Q_i = f(P_i, P_{is}, X_i, \varepsilon_i)$$

where Q_i is the quantity of the tourism product demanded in Macau by tourists from country/region i, P_i is the cost of living for tourists in Macau relative to the cost of

living at home, P_{is} is the cost of living for tourists in substitute destinations relative to the cost of living in Macau, X_i is the level of income in country of origin i, and ε_i is the disturbance term that captures all other factors which may influence the quantity of the tourism product demanded in Macau by tourists from country of origin i. Tourism demand is measured by the number of tourist arrivals from a particular country of origin in Macau. The data are quarterly covering the period from 1992 Q1 to 2003 Q2. The cost of living for tourists in Macau relative to the country of origin is measured by the Consumer Price Index (CPI) in Macau divided by the CPI in the country of origin and adjusted by the appropriate exchange rates. The income level in the country of origin is measured by the GDP indices in the country of origin in real terms.

In this paper the VAR model is used to forecast the demand for Macau tourism by tourists from eight major countries; namely China, Hong Kong, Taiwan, Japan, Korea, Philippines, the UK and the US. Based on the VAR model, impulse response analysis is carried out to investigate how long shocks in a particular variable are likely to have an effect on tourist arrivals and with what intensity.

The evidence shows that tourism demand generally responds with 'correct' signs to these shocks, but magnitudes of the responses are relatively small. The results also suggest that the influences of the shocks on tourism demand tend to last about 3-4 years. The forecasting results show that the growth of tourist arrivals from China is expected to be the strongest among the eight countries of origin. Tourist arrivals from Hong Kong are expected to decline during the forecasting period, and this is likely to be caused by the increasing competition from China. Another major market, Taiwan, shows an increasing trend accompanied by some large fluctuations, but there is a decline at the

end of the period. It is possible that the expected opening of the new Las Vegas style casinos or theme hotels may reverse the declines in Hong Kong and Taiwan arrivals. The forecasts for the other five countries of origin show that the demand for Macau tourism by residents from these countries of origin are likely to increase over the forecasting period, but the scale of increase is much smaller than that of China.

The result suggests that Macau will face increasing tourism demand by residents from mainland China. Since the needs of Chinese tourists tend to be different from those from other origin countries, especially Western countries, the business sectors in Macau need to pay considerable attention to catering for the needs of Chinese tourists. Although some of the Chinese tourists are seasoned gamblers, a relatively large proportion of the independent travellers are likely to be cultural, leisure and shopping tourists. Therefore, the provision of facilities for these travellers will be a key to successfully attracting more high-class tourists from mainland China to Macau.

Zhou, *et al.* (2004) investigated the long run cointegrating relations of Hawaii tourism model. This paper estimates a demand-supply model for Hawaii tourism using a system based on cointegration approach. Quarterly data from 1980 Q1 to 2001 Q2 of the variables had been used. The selected variables are US visitors to Hawaii (*vus_hi*), Japanese visitors to Hawaii (*vjp_hi*), the US real personal income (*nir_us*), US consumer price index (*cpi_us*), Japanese real personal income (*nir_jp*), Japanese exchange rate adjusted CPI (*p_jp*), Hawaii average daily hotel room price (*prm_hi*), Hawaii average daily hotel occupancy rate (*ocup_hi*) and Hawaii visitor plant inventory (*trms_hi*). The Hawaii tourism system under consideration has nine variables z_t =

(*vus_hi, vjp_hi, prm_hi, ocup_hi, trms_hi, nir_us, cpi_us, nir_jp, p_jp*), among which y_t = (*vus_hi, vjp_hi, prm_hi, ocup_hi, trms_hi*) are endogenous and x_t = (*nir_us, cpi_us, nir_jp, p_jp*) are exogenous according to tourism demand and supply theories.

The methodology used for this paper is based on VEC model which is used to determine the existence of long run relationship between variables. The study considers a VAR(k) model in an $(m\times1)$ vector of $I(1)$ variables, z_t:

$$z_t = c+\Phi_1 z_{t-1}+...+\Phi_k z_{t-k}+\varepsilon_t, \quad \text{for} \quad t=1,\ 2,\ ...,N \tag{1.1}$$

where c is an $(m\times1)$ vector of unknown deterministic terms; Φ_i, $i=1,\ 2,...,k$ are $(m\times m)$ matrices of unknown parameters; ε_t is a $(m\times1)$ vector of disturbances that is i.i.d.$(0,\Omega)$. The model specified in Equation (1.1) can be reparameterized as a VEC model:

$$\Delta z_t = -\prod z_{t-1}+\sum_{i=1}^{k-1}\Gamma_i\Delta z_{t-1}+c+\varepsilon_t, \quad \text{for} \quad t=1,\ 2,\ ...,N \tag{1.2}$$

where $\prod = I_m-\sum_{i=1}^{k}\Phi_i$, $\Gamma_i=-\sum_{j=i+1}^{k}\Phi_j$, $i=1,...,k-1$. The equilibrium properties of Equation (1.2) are characterized by the rank of $\prod$. Tourism demand and supply theories suggest the existence of three long-run cointegrating vectors,

$$vus\_hi = \alpha_0+\alpha_1*nir\_us+\alpha_2*cpi\_us+\alpha_3*prm\_hi+e_{us}$$

$$vjp\_hi = \beta_0+\beta_1*nir\_us+\beta_2*cpi\_us+\beta_3*prm\_hi+e_{jp}$$

$$prm\_hi = \gamma_0+\gamma_1*(vs\_hi+vs\_jp)+\gamma_2*occup\_hi+\gamma_3*cpi\_us+\gamma_4*trm\_hi+e_{prm}$$

where e_{us}, e_{jp}, and e_{prm} are regression residuals.

For tourism activities in Hawaii, the paper identifies one demand relation each for the US and Japanese visitors and an inverse supply curve depicting average hotel room prices. The results shows that if US arrivals are less than predicted by US real income growth and the relative cost of Hawaii vacation, arrivals would increase over time to eliminate the disequilibrium error. Furthermore, disequilibrium in hotel room price has a larger dampening effect on visitors from Japan. The result also finds the important of US visitor arrivals in determining hotel occupancy.

Lim (2004) analyzed the seasonal patterns of tourist arrivals from South Korea to Australia and use econometric time series modelling of inbound tourism. The data are based on seasonally unadjusted quarterly data for 1980 Q1 to 1999 Q4. The data consist of tourist arrivals from South Korea to Australia (*A*), real gross national product (*GNP* or *GNI*), relative prices (*RP*), exchange rate (*ER*), and real exchange rate (*RER*).

In this study, Ordinary Least Squares (OLS) method is used to estimate the influence of economic variables on tourism demand by South Korea for Australia. Monthly seasonal indices for tourist arrivals are computed using the ratio-to-moving average technique. As a guide to model selection, the Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC) are useful measures of goodness of fit. The model with the smallest AIC and SBC values is preferred. The demand by origin j for international tourism services in destination i can be expressed as:

$$DT_{ij} = f(Y_j, TC_{ij}, TP_{ij}, QF_i)$$

where DT_{ij} is the demand for international travel services by origin j for destination i; Y_j the income in origin j; TC_{ij} the transportation costs between destination i and origin j;

TP_{ij} the tourism prices (that is, the ratio of prices in destination i to prices in origin j and in alternative destinations); and QF_i is the qualitative factors in destination i. In this model, tourist arrivals (A) are a proxy for DT, real GNP and GNI are proxies for real income (Y), and relative prices (RP), exchange rate (ER) and real exchange rate (RER) are proxies for TP. In this study, two dummy variables; the complete removal of travel restrictions on South Korean residents in 1989 ($D89$) and the currency crisis in the latter half of 1997 ($D97$), and seasonal dummy variables, D_{2t}, D_{3t} and D_{4t} are included in the model.

The data reveals that South Korea had emerged as a booming source market of tourists for Australia prior to the Asian economic crisis. The estimated OLS can be written as:

$$\ln A_t = -38.5 + 6.20 \ln GNP_t - 6.05 \ln RP_t + 0.68 \ln A_{t-1} - 0.51D_{2t} - 0.55D_{3t} - 1.02D_{4t} - 0.40D89 - 0.90D97 \quad (1.3)$$

Equation (1.3) shows strong economic growth, rapidly rising income and the easing of overseas travel restrictions are some of the developments in South Korea which have benefited Australia's inbound tourism. In this study, only $D97$ has a marginally significant impact on tourist arrivals from South Korea to Australia. It is believed that South Koreans have restructured their travel patterns and prefer to travel to closer destinations due to the loss in their purchasing power after the currency crisis. Furthermore, there is growing evidence of market shifts in intra-Asian travel following the terrorist attacks in the US on 11 September 2001.

Proenca and Soukiazis (2005) estimated the demand function of tourism in Portugal by considering four main countries as the basic tourism suppliers, Spain, Germany, France and the UK to explain tourism performance in Portugal. A panel data estimation approach was used to identify the main determinants of the tourism demand in Portugal over the period from 1977 to 2001. Annual data is preferable in order to avoid seasonality problems which are dominant in this sector. In this study, an expenditure approach is used to define the demand for tourism in Portugal. The tourism demand is defined as the share of the expenditures of each sending country to the total expenditures on tourism in the receiving country (Portugal):

$$w_{i,t} = \frac{\text{Total tourism spendings in the destination country}}{\text{Tourism spendings of the sending country}}$$

with $i = 1, ..., 4$ (the four main sending countries, Spain, Germany, France and the UK) and $t = 1977, ..., 2001$. The explanatory variables have been used are real per capita income of the sending country (Y), relative price between the receiving and the sending countries (P), accommodation capacity (A), the ratio of public investment to GDP (IP) and a dummy variable ($D86$) is used to capture the effects of the Portuguese integration in the EU. The dummy variable ($D86$) is to verify if the border openness with the accession of Portugal in the EEC provoked a higher inflow of tourists into the country.

The estimate results based on Generalised Method of Moment is given as:

$$\ln w_{i,t} = \alpha_i + 0.091 \ln Y_{i,t} - 0.121 \ln P_{i,t} + 0.920 \ln A_t - 0.425 \ln IP_t - 0.003 D86_t - 0.780 \ln w_{i,t-1}$$

The study suggests that accommodation facilities is the most important supply factor influencing the decision of tourists to choose Portugal as the destination place per capita income is not a significant explanatory factor for the demand determinants. The value of the adjustment coefficient, $\delta = 1–0.78 = 0.22$ gives evidence of a rather low adjustment process between the actual variation of the demand for tourism and the desired long-run level. This means that the number of tourists visiting Portugal each year does not differ substantially from the previous years giving evidence of some kind of inertia or rigidity in the tourism inflows.

Dritsakis and Gialitaki (2004) carried out an investigation to determine seasonal tourism demand models from the US to Greece using Vector Error Correction (VEC) models. This paper estimates the elasticities among income in country of origin, consumer prices index of both countries and transportation cost of inbound tourism from the US to Greece, exchange rate, and prices of goods and services of a competitive country using seasonally unadjusted quarterly data. In the analysis of this paper quarterly data for the period from 1960 Q1 to 2000 Q4 for all variables has been used.

In this paper a dynamic linear logarithmic model of tourist demand from the US to Greece is used. Even though it is well known empirically that many macroeconomic time series are non-stationary, nonetheless most published empirical tourism research has estimated static models in logarithmic levels using ordinary least squares. This practice gives rise to invalid inferences long-run relationships among of variables. Cointegration techniques permit the estimation and testing of long-run equilibrium relationships, as suggested by economic theory. The VEC model provides a way of combining both the dynamics of the short-run and long-run adjustment processes

simultaneously. The empirical results suggest that international tourism demand from the US to Greece is elastic in relation to real income, transportation cost and nominal prices of goods and services of Turkey and inelastic in relation to relative consumer price index of both countries in accordance with cointegration model, which represents the long run equilibrium relationship of tourism demand.

Durbarry (2002) investigated the long run structural tourism demand modelling of France using Almost Ideal Demand System (AIDS) model. The AIDS model provides a well–structured framework for modelling tourism demand. The model enables inferences to be made on whether destinations competing for tourists from the same origin countries can be regarded as complements or substitutes to other destinations. Due to data unavailability, the author considered only three main destinations for French tourists; Spain, Italy and the UK. The used of long run structural modelling approach has an obvious advantage that it allows for any possible interdependencies that may exist among the variables. Hence, the model can further be used to assess effects of shock on the system and on variables for policy purpose, for instance via the impulse response analysis.

The result indicates that if the effective price in the UK increases by 1% the French expenditure share in the UK will decrease by around 0.13%. Although not significant, the study found that a 1% increase in real income, for instance, would increase expenditure share in the UK and Spain by 0.0028% and 0.0004% respectively and decrease the share in Italy by 0.0032%. These indicate that in terms of spending additional income, the UK and Spain would be ranked as first choice destination for French tourists, and Italy as a secondary destination. Concerning the dummy variables,

the one accounting for the world recession is only significant in the case of Spain, while the Gulf war dummy variables was negatively significant in the case of Spain, but positive and significant in the case of Italy. In the case of the UK, both dummies were insignificant. Although there is some evidence to suggest that the pricing policy in Italy does not impact on the French's tourism demand in the UK, price changes in Spain have significant, although low, impact on tourism demand in the UK. These suggest that the French regard Spain and the UK as substitute destination.

Lim (1997) carried out a review of international tourism demand. This paper determines type of data, sample sizes, model specifications, the types of dependent and explanatory variables used, and the number of explanatory variables used in the studies of empirical international tourism demand models. This paper concludes that most of the studies undertaken have been published in the 80s, have used annual data, and have been based on estimation of log linear single-equation models. Tourist arrivals or departures and expenditures/receipts have been the most frequently used dependent variables. The most popular explanatory variables used have been income, relative tourism prices, and transportation costs.

Maliugina (2006) aimed to verify determinants of inbound tourism demand in Ukraine using theoretical framework of gravity model. Ordinary least squares (OLS) with panel-corrected standard errors (PCSE) estimation technique is employed. This study used unbalanced panel data in the analyses. The results suggest that the number of foreign tourist arrivals in Ukraine depends positively on wealth of tourists and total number of their departures while the number of tourist arrivals depends negatively on distance to Ukraine and visa requirements for residents of a country. This paper

suggests abolishing visa requirements for world greatest traveling nations; Germany, the UK, Italy, the US and Japan.

Seetanah (2006) identified and quantified the factors that have made Mauritius attractive to tourists and also to investigate the importance of public capital, particularly transportation capital, in the overall destination's attractiveness. This paper used cointegration and VEC analysis in an extended demand for international tourism function. The results of the analysis show that transport infrastructure of the country has been contributing positively to the number of tourist arrivals during the period of 1968 to 2004 in both short and long run. Also, tourism infrastructure is reported to be a more important ingredient than transport in the tourism demand model. This study emphasized the importance of transport infrastructure in adding to the attractiveness of a destination.

There are many other studies that have investigated tourism demand model for many countries and have used different methods. Salman (2003) used cointegration analysis to estimate the long run relationship between monthly tourist flows to Sweden from the US, UK, Germany, Finland, Denmark and Norway, and the factors that can influence arrivals. The paper has also considered the impact of Chernobyl nuclear accident and 1991 Gulf War on tourist arrivals. The estimated model does not indicate any statistically significant effect of the Chernobyl nuclear accident, or the 1991 Gulf War on international tourism demand. On the other hand, the estimated model does indicate statistically significant effect of income, exchange rate and the consumer price index (CPI) on international tourism demand.

Other studies include Law and Au (1999) presented an approach that used a supervised feed-forward neural network model to forecast Japanese tourist arrivals in Hong Kong. Chu (2004) employed cubic polynomial model to forecast the volume of tourist arrivals to Singapore. Preez and Witt (2003) used univariate and multivariate time series models to forecast international tourism demand. Han, *et al.* (2006) used almost ideal demand system model to examine the US demand for tourism in European destinations.

In the context of Malaysia, only few studies have been documented on modelling determinants of tourism demand. Of these studies, Arsad, *et al.* (2005) recently investigated macroeconomic variables and its effect to tourism industry using error correction model approach. Shitan and Mah (2005) used ARIMA model to forecast tourist arrivals from Singapore to Malaysia.

1.3 Objectives

The main purpose of this study is to analyze the dynamic interactions between the number of tourist arrivals from a few countries or regions in Malaysia (TA) and four selected variables; namely Consumer Price Index (CPI), exchange rate (EXR) of Malaysia Ringgit to a unit of foreign money, number of tourist arrivals in substitute (competing) destination Singapore (SUBS) and number of tourist arrivals in substitute destination Thailand (SUBT). The analysis is based on Vector Autoregression (VAR) model. The existence of long run relationship is investigated by using the Johansen and Juselius (JJ) cointegration test while Granger causality test is employed to investigate short run relationships. Nine countries of region have been selected in this study;

namely China, Europe, Indonesia, Japan, Saudi Arabia, Singapore, Thailand, the United Kingdom (UK) and the United States (US).

The first objective of this study is to investigate the interactions or linkages between the number of tourist arrivals in Malaysia and the four selected variables. Interactions or linkages among the variables are investigated based on the existence of causality. This study also looks at the speed of adjustment to long term equilibrium as a result of any short term deviation. Analyses will be carried out using monthly data for all the nine selected countries or regions.

The second objective is to examine the effect of exogenous dummy variables to the Malaysia tourism demand model. There are four dummy variables that have been selected; namely temperature (TEMP) at the capital cities of the selected countries, bombing in Indonesia (BOMB), the outbreak of severe acute respiratory syndrome (SARS) and the September 11 terrorist attack in New York City (NY911). Analysis is also carried out to investigate the different of linkages between TA and the selected variables using model with and without the four dummy variables.

1.4 Data

For the first and second objectives, monthly data from January 1999 to September 2006 will be used in the analysis. The data for the number of tourist arrivals used in the first objective are downloaded from the website of Malaysia Tourism Promotion Board (MTPB) (http://www.tourism.gov.my), Singapore Tourism Board (STB) (http://app.stb.com.sg/asp/index.asp), and Tourism Authority of Thailand (TAT)